Foodborne Illness Information

from the Working Group on Foodborne Illness Control

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Monthly Statistics

Number of Complaints of Foodborne Illness Received by the Working Group on Foodborne Illness Control (Confirmed and Unconfirmed)

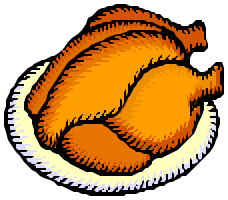
Month	Single Reports (one person ill)		Multiple (two or more people ill)	
	2003	Average (1997-2002)	2003	Average (1997-2002)
January	21	17	14	12
February	17	18	10	13
March	10	21	6	14
April	19	20	4	11
May	17	22	16	12
June	30	21	12	8
July	8	19	12	11
August	28	28	16	13
September	26	18	9	13
October	16	18	15	11

Laboratory Confirmed Cases Reported to the Division of Epidemiology and Immunization*

Month	*Campylobacter*		*Salmonella*		Shiga-toxigenic *E. coli*	
	2003	Ave. (1997-2002)	2003	Ave. (1997-2002)	2003	Ave. (1997-2002)
January	74	70	53	67	2	5
February	61	65	48	65	0	4
March	70	82	68	76	0	5
April	78	89	62	89	2	7
May	95	117	93	102	4	12
June	143	161	147	138	6	18
July	139	156	192	158	9	28
August	121	127	191	175	14	24
September	112	102	119	140	12	21
October	79	109	75	107	8	12

* Number of cases recorded as of November 1, 2003. Number of 2003 cases may change due to delays in reporting and data entry.

What's New in Foodborne Illness: Outbreaks and Information



Outbreak of Salmonellosis in a Correctional Facility: The Inside Story

by Dawn Heisey-Grove, MPH and Erica Berl, DVM, MPH

On July 28, 2003, the Massachusetts Department of Public Health (MDPH) was notified of an outbreak of gastrointestinal illness in a correctional facility that houses approximately 1500 male inmates in 20 different units. One inmate had been hospitalized with culture-confirmed salmonellosis. Approximately 19 other inmates and three staff members reported gastrointestinal illness, with onsets ranging from July 18th through the 25th. Approximately 70 inmates were working in the kitchen, but initial reports indicated no illness among food workers.

In response to the initial report, the MDPH Working Group on Foodborne Illness Control initiated an investigation in cooperation with the Division of Community Sanitation (DCS). Staff from the Division of Epidemiology and Immunization (EPI), Division of Food and Drug (DFD) and DCS conducted a site visit on July 30th.

EPI interviewed five inmates who were culture-confirmed cases regarding their illness and food history. The food histories were not very informative because inmates generally consume the entire meal that is provided to them and do not have access to food from outside of the facility. Therefore, a questionnaire about food history was not distributed. A few inmates reported that some of the chicken they recently consumed looked undercooked.

The staff was interviewed about the general operation of the facility in order to learn about any inmate behaviors that may have contributed to the outbreak. The inmates are housed in 20 residential units. Inmates have multiple opportunities for person-to-person contact within a unit, but limited opportunity exists for contact with inmates from other units. All activities occur within an inmate's unit of residence, except for kitchen or laundry work and classes. However, inmates are reassigned to new units frequently.

The staff eats the same food as the inmates. Many of the inmates have plastic containers to store leftover food in their rooms, but they do not have access to refrigeration. A microwave, which is not routinely cleaned, is available in each unit. Inmates are provided with a reusable eating utensil which they store in their cells. The inmates are responsible for keeping their eating utensil clean, and the utensils are not routinely sanitized. EPI also learned that several inmates had recently been fired from kitchen work for smuggling chicken to other inmates within the facility.

DFD and DCS conducted an environmental investigation of the kitchen. The kitchen operates 24 hours a day and prepares three meals a day for inmates and staff. Most of the kitchen workers are inmates who are supervised by paid civilian staff, as well as several corrections officers. Overall, food preparation practices were adequate. Much of the food prepared in the facility was highly processed or pre-cooked. Chicken was the only meat that was regularly prepared from the raw state. Fresh fruit and vegetables were occasionally served, but usually limited to lettuce and tomatoes.

Because it was unclear which food, if any, was the source of this outbreak, HACCP risk assessments were done on the preparation of several foods. The preparation of the baked chicken was reviewed very closely because it was the highest risk food served during the incubation period of the earliest cases.

The chicken was received as frozen bone-in chicken pieces (220 grams each). They were thawed on sheet pans under refrigeration (38 ºF) the day before cooking. For the meal in question, it is possible that additional frozen chicken may have been pulled from the freezer closer to cooking. The chicken was baked in large batches for approximately one hour at 375º F. At least one chicken breast in each batch was checked for the final cooking temperature. The supervisors maintained a temperature log that indicated final cooking temperatures ranged from 180-190º F on the day in question. The chicken was then held for up to approximately two and one-half hours in warmed ovens until individually plated, covered and distributed to inmates.

Although the cooking procedure appeared adequate, it is possible that not all of the chicken reached the proper temperature due to the large size of each batch. Multiple temperatures should be checked when cooking large batches of food. For safety reasons, stem thermometers must be signed out by a supervisor, and this limits their use. The facility should consider using disposable thermometers in the place of stem thermometers to increase the frequency of monitoring final cooking temperatures of raw animal foods. The facility voluntarily stopped serving the

chicken breast, and it was recommended that they use a pre-cooked chicken breast in the future.

Initially, it was reported that no food workers were ill, but this turned out to be inaccurate. In fact, the medical staff had begun excluding ill inmates from working in the kitchen before MDPH had been notified about the outbreak. In order to ensure that food workers were not infected, they were required to submit two consecutive negative stool samples.

Asymptomatic foodworkers were initially allowed to continue working pending test results. Kitchen supervisors were instructed to question inmates about their health at the beginning of every shift, to exclude any ill workers and to refer them to the medical unit for evaluation. However, a number of asymptomatic food workers were soon identified as culture-confirmed cases, and it became clear that excluding workers based on symptoms was ineffective. Therefore, all inmates were excluded from working in the kitchen and were not allowed to return to work until they submitted two negative stool samples. In addition, the facility was instructed not to bring inmates back into the kitchen until the outbreak in the facility was contained, and inmate kitchen workers were no longer at risk for becoming infected.

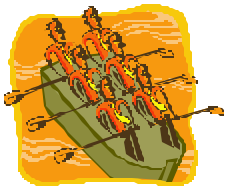
New cases continued to be identified over the next two weeks. In addition to ensuring that there were no infected kitchen workers, recommendations were made to control person-to-person spread among the inmates. These included reinforcing good hygiene practices and thorough sanitizing of bathroom facilities. Housing all ill inmates in the same unit would have been the best way to protect the well, at-risk population from person-to-person spread. This was not feasible, however, as there was not enough space to provide infected inmates with their own unit. Instead, the well kitchen workers were moved into a unit that had not had any previously identified ill inmates. This arrangement was maintained until the outbreak had resolved. Kitchen workers who had submitted two negative stool samples were then allowed to work in the kitchen.

Regular contact between EPI, DFD and staff at the correctional facility was maintained to monitor the outbreak. Any inmate or staff who reported gastrointestinal illness or who requested testing were tested for enteric pathogens. Any inmate who was culture-positive was then interviewed by the medical staff to determine a precise onset of illness. Once ten days had gone by without any new onsets, the outbreak was considered resolved. The last culture-positive case had an onset of August 15, 2003.

In total, stool specimens were collected from 132 inmates and staff. Thirty-nine inmates had laboratory-confirmed salmonellosis, 14 of whom were kitchen workers. Onsets ranged from July 18th through August 15th. Of the 39 cases, 26 were serotyped as Newport, 7 as Muenster var 15+, 2 as Heidelberg, one as Hadar, and 3 with co-infection by 2 serotypes: one with Newport and Heidelberg, and 2 with Montevideo and Newport. Although two staff reported illness, their stool specimens were negative for enteric pathogens. A staff nurse also reported illness after caring for an ill inmate but did not submit a stool sample.

The source of the outbreak could not be definitively identified. However, based on the fact that chicken is one of the few high-risk foods the facility receives uncooked, the multiple serotypes identified in the outbreak and reports of chicken theft by inmates, chicken remains the suspected source.

The Working Group on Foodborne Illness Control: What Can We Do For You?



by Erica Berl, DVM, MPH

This newsletter is published by the Massachusetts Department of Public Health's (MDPH) Working Group on Foodborne Illness Control (WGFIC). The WGFIC was created in 1986 to facilitate the investigation of foodborne illness outbreaks. Its main purpose is to improve communication and collaboration among those involved in outbreak investigations. Epidemiologists from the Division of Epidemiology and Immunization, food safety specialists from the Division of Food and Drugs and laboratory personnel from the Bureau of Laboratories participate in the WGFIC.

The WGFIC partners with local health departments to investigate and control outbreaks of foodborne illness in their jurisdictions. Typically, when an outbreak is detected, one state epidemiologist and one state food safety specialist will be assigned to help the local health department with the investigation. These two people make sure the local health department has the needed support from MDPH. For example, they will help the local health personnel obtain stool kits, collect food samples, collect relevant epidemiological information and will advise on conducting the environmental investigation. They also work with laboratory personnel to determine what testing needs to be done. Most important, they work with local health personnel to ensure that necessary control measures have been put in place in order to stop the spread of the outbreak.

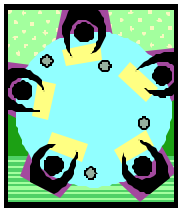
The WGFIC meets twice each month to discuss ongoing outbreak investigations and any other issues relating to foodborne illness investigations and

surveillance. Staff from the Boston Public Health Commission regularly participate in the meetings, and all local health personnel are welcome to attend.

At the meetings, all new and ongoing outbreak investigations are discussed. The members of the WGFIC who are assigned to an outbreak present what is known about the outbreak and how the outbreak is being investigated. Results of case interviews or questionnaires, related lab work, and the environmental investigation are discussed. The group reaches a consensus about what additional steps, if any, need to be taken to investigate the outbreak. The group will also evaluate whether sufficient control measures have been implemented to protect the public health and will make additional recommendations if needed. In addition, the WGFIC maintains an electronic database of all the suspect foodborne illness complaints received by MDPH.

The WGFIC fosters good communication among the three state Divisions involved in outbreak investigations and with the local health departments. The discussions at the meetings allow for the exchange of information and ideas by people with different areas of expertise, which helps to ensure that nothing critical to the investigation is left out, and that outbreaks are investigated as thoroughly as possible.

Local health personnel are welcome to attend meetings of the WGFIC. The meetings occur the 1st and 3rd Tuesday of each month at 9:15 AM in room 123 at the State Laboratory Institute. If you wish to attend, it is recommended that you call first to confirm that there is a meeting. Call Erica Berl from the Division of Food and Drugs at 617-983-6768, or Emily Harvey from the Division of Epidemiology and Immunization at 617-983-6842 if you would like to attend.



Pulsed Field Gel Electrophoresis

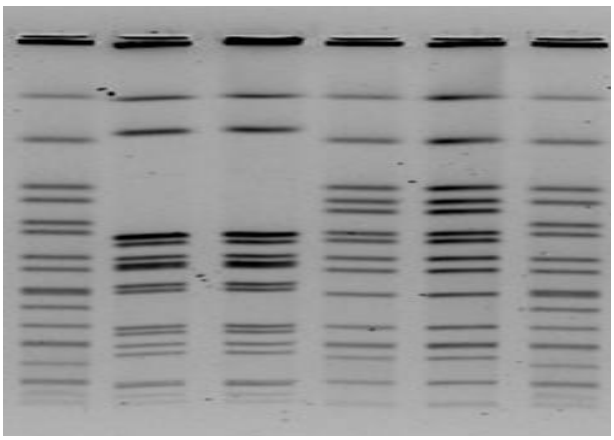
by John Fontana, PhD.

Pulsed field gel electrophoresis (PFGE) is a DNA fingerprinting method used to subtype bacterial pathogens to determine their relatedness in suspect clusters of cases or outbreaks. The Massachusetts PFGE Laboratory has been a Centers for Disease Control and Prevention PulseNet Regional Laboratory since the inception of the PulseNet System in 1996.

PulseNet is a national network of state and federal laboratories that perform PFGE on foodborne bacterial pathogens using standardized methods for sample preparation, test conditions and data analysis. As one of seven regional PFGE Laboratories, the Massachusetts laboratory provides training and support to 8 PFGE laboratories in the Northeast located in CT, ME, NH, NJ, NY, NYC, RI, and VT.

A DNA "fingerprint" of a bacterium is produced by extracting DNA from an isolate from a culture of a human or food specimen. The isolate must be taken from a single colony to assure that it is a single strain of a bacterium. The extracted DNA is "cut" using a restriction enzyme, which recognizes and cuts the DNA at specific sites, resulting in a reproducible mixture of many different sized DNA fragments. The fragments from each isolate are then placed in agarose gel and subjected to a variable electrical current. The fragments move through the gel because of the force of the electrical current which causes the smaller fragments to move more quickly than the larger fragments. Because many of the DNA fragments are large, the current is "pulsed", or switched back and forth, between electrodes in the electrophoresis chamber in order to help the larger fragments to wind through the porous gel. Without "pulsing", only small DNA fragments would separate in the gel. Similar size fragments migrate together. Once the fragments are separated, the DNA is stained with ethidium bromide and bands of like-sized fragments are observed. These banding patterns are analyzed using a standard computer application common to all PulseNet laboratories.

The gel below has 6 vertical "lanes" with each lane representing a single specimen. The far left and far right lanes (1 and 6) contain control organisms, and lanes 2 to 5 each contain different patient isolates. The two patient isolates in lanes 2 and 3 have indistinguishable or "matching" patterns. The patient isolates seen in lanes 4 and 5 also match each other but are different from the pattern in lanes 2 and 3.



Lanes 1 2 3 4 5 6

The DNA patterns of bacterial isolates suspected to be involved in an outbreak are compared to each other with the understanding that the more similar two patterns are, the more likely the isolates are from a common source. The PFGE fingerprints are analyzed using BioNumerics® software, and the banding pattern of each new isolate is compared to the local database of existing PFGE patterns. The results are then shared with other participating laboratories by transfer of digital images to the national PulseNet database via a secure Internet connection. This process allows for rapid identification of clusters on a local and national level. Clusters of common PFGE patterns are reported to state epidemiologists who follow-up individual cases to determine if a common source of exposure can be identified, such as a food item.

In October 2003, the Massachusetts PFGE lab identified 2 isolates of *E. coli O157:H7* with indistinguishable PFGE patterns. Massachusetts posted this small cluster to PulseNet's on-line forum, and within three days Pennsylvania reported an isolate with the same pattern. As of mid-November the ongoing investigation has expanded to include 43 isolates from 17 states.

The Massachusetts PFGE Laboratory routinely runs PFGE on over 2,000 isolates each year, including *E. coli O157:H7;* shiga toxin-producing, non-O157:H7 *E. coli*; *Salmonella* serotypes; *Shigella sonnei; Listeria monocytogenes; Neisseria meningitidis;* Methicillin resistant *Staphylococcus aureus*; Group A *Streptococci* and *Bordetella pertussis.*

In addition, the laboratory tests isolates associated with nosocomial infections by special requests to aid investigation of significant hospital infectious disease outbreaks. Nosocomial investigations can include Group A Streptococci, *Streptococcus pneumoniae,* vancomycin resistant *Enterococci* and methicillin resistant *Staphylococcus aureus.*

For details on testing for all pathogens see: ***http://www.state.ma.us/dph/bls/manual/profiles.pdf*** *PFGE testing can be found at this site under "Bacterial Typing, Pulsed Field Gel Electrophoresis (PFGE)".*

Food Safety Web Links

Foodsafe Discussion Group:
http://www.nal.usda.gov/foodborne/foodsafe/index.html

This is an e-discussion group for food safety professionals to share resources, information and innovative solutions to food safety problems. The USDA Food Safety and Inspection Service and the Food and Drug Administration sponsor this discussion group in conjunction with the ARS National Agricultural Library's USDA/FDA Foodborne Illness Education Information Center.

Join FSNet:
http://www.foodsafetynetwork.ca/

FSNet, AgNet, AnimalNet and Functional FoodNet provide current, generalized, public risk perception information about rapidly changing issues. This information is culled from journalistic and scientific sources around the world and condensed into short items or stories that are distributed daily by electronic mail to thousands of individuals from academia, industry, government, the farm community, journalism and the public at large. FSNet focuses on food safety issues.